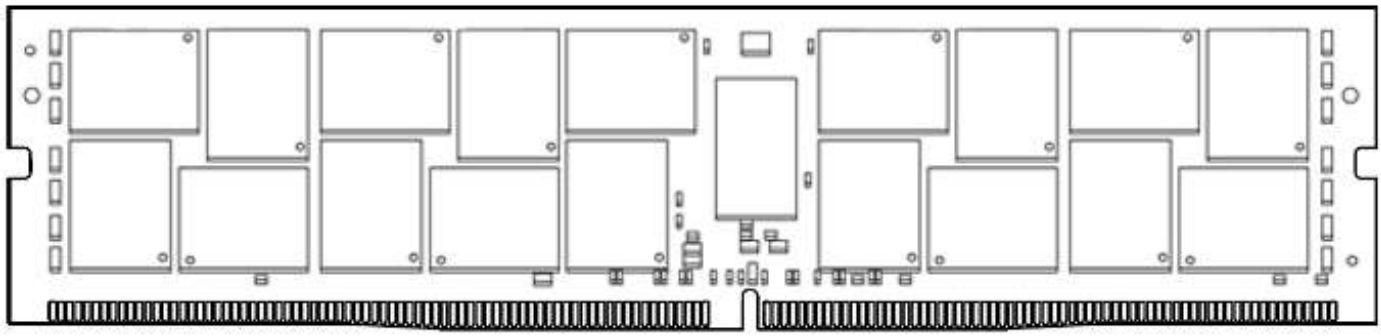
Overview

HP DDR4 SmartMemory

Is finding reliable DRAM memory for your HP ProLiant Server series in your data center a major challenge?

When you choose HP SmartMemory you get the same high quality, reliability, and confidence that come with your HP ProLiant Gen9 Server series. DRAM quality and reliability are more important now than ever. Industry trends such as server virtualization, cloud computing, the use of large database applications and high-performance computing have all increased the need for higher capacity memory with greater reliability and uptime. HP SmartMemory is unique technology was introduced in ProLiant Gen8 Servers and in ProLiant Gen9 Servers it unlocks certain features available only with HP Qualified Server memory. HP SmartMemory enables ProLiant Gen9 systems to reliably identify and verify whether installed memory has passed the rigorous HP qualification and testing processes. And because the memory is authenticated, extended memory performance features can be enabled through the system ROM.



What's New

- HP SmartMemory DDR4 @2133 Memory supported on ProLiant Gen9 Servers
- HP SmartMemory RDIMM and LRDIMM will operate at 2133MHz @2DPC

Models

Registered DIMMs (RDIMMs)

HP 8GB (1x8GB) Single Rank x4 DDR4-2133 CAS-15-15-15 Registered Memory Kit	726718-B21
HP 16GB (1x16GB) Dual Rank x4 DDR4-2133 CAS-15-15-15 Registered Memory Kit	726719-B21

Load Reduced DIMMs (LRDIMM)

HP 32GB (1x32GB) Quad Rank x4 DDR4-2133 CAS-15-15-15 Load Reduced Memory Kit	726722-B21

Standard Features

What is HP SmartMemory?	HP SmartMemory is unique technology introduced for ProLiant Gen8 servers that unlocks certain features available only with HP Qualified Server memory. In Gen9 Server also HP SmartMemory enables ProLiant Gen9 systems to reliably identify and verify whether installed memory has passed HP's rigorous qualification and test processes. HP SmartMemory is authenticated, extended memory performance features can be enabled through the system ROM. HP SmartMemory will provide a platform to allow future memory-related support enhancements through HP Active Health System, System Insight Management and Insight Control management software.
Memory Quality and Reliability	Today's IT environments are seeing larger, more complex applications, an increase of mission-critical data moving to the server, increasing demand for transaction processing and critical server consolidation. Memory is a critical component of the information system, significantly defining the systems reliability, performance, and increasingly the overall server and data center power footprint. This is why HP Qualified Server Memory undergoes intense rigorous qualification process that begins with using the highest quality components sourced from tier 1 DRAM suppliers. Only memory that meets HP's strict requirements are selected to begin the HP Memory Qualification process. Unlike most third party memory manufacturers, testing is performed and optimized on every HP ProLiant server platform to ensure upmost compatibility, performance and reliability.
Performance	As HP SmartMemory is certified, performance tested and tuned for HP ProLiant, certain performance features are unique with HP SmartMemory. For example, while the industry supports DDR4-2133 RDIMM today's Gen9 servers support DDR4-2133 RDIMM up to 2 DIMMs per channel at 12133MT/s. This equates to up to 14% more performance at the DIMM level with no penalty.
Power Efficiency	Memory plays an increasingly larger part of the server's power consumption and choosing the most efficient memory is a critical component in reducing your data center's overall power and cooling requirements. This savings translates to reduced operating cost and a faster return on investment, freeing up IT budget spent on power and cooling. HP is committed to helping you get the maximum benefit per watt out of your IT infrastructure. For example, HP SmartMemory DDR4-2133 Registered memory is engineered to achieve the much higher performance level as 1.2V memory saving up to 35% more power when compared to DDR3-1866 running at 1.5V. This also simplifies the HP memory portfolio making it easier to select the right memory.
Pre-Failure Alert	When used in conjunction with Systems Insight Manager, the SMART capable firmware enables fault prediction capabilities. If potential problems develop in one of the DIMMs, Systems Insight Manager lets you know in advance so you can have the DIMM replaced, before it fails, under warranty. **NOTE:** HP memory is protected by a Pre-Failure Alert when used with HP Systems Insight Manager, allowing memory to be replaced before failure under warranty. In addition, HP memory is covered by a one or three-year limited on-site warranty period for the system in which they are installed. The memory warranty is automatically uplifted when used in a server for which a Care Pack is purchased. Please see the Support Services section below for additional services.
HP Advanced Memory Error Detection Technology	In the ProLiant System ROM upgrade (version May 2011 or later), HP enhanced memory error protection with HP Advanced Memory Error Detection Technology. This innovation monitors several memory parameters and seeks out specific defects that either cause performance degradation or significantly increase the probability of a non-recoverable memory condition. By improving the prediction of critical memory error conditions, this technology prevents unnecessary DIMM replacement and increases server uptime. For more information on the HP Advanced Memory Error Detection Technology: http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02878598/c02878598.pdf
HP Active Health System	Future ROM updates will enable HP SmartMemory to will work in conjunction with HP Active Health

Standard Features

	System which monitors changes to the server hardware configuration to enable lifecycle monitoring of memory health status. Having insight into memory related service events will shorten diagnosing problems and deliver rapid resolutions if and when failures occur. Whereas Pre-Failure Alert simply notifies the administrator of an impending failure, HP SmartMemory will provide insight with rich information on memory-related events like multi-bit errors or configuration issues.
Support Matrix	Please see the following URL for the latest list of supported servers: http://www.hpproliantoptions.com/
Warranty	For details on HP Qualified Options Limited Warranty visit: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html
Other Resources	For information regarding HP Qualified Server Memory visit: www.hp.com/products/memory For the latest updates on HP Qualified Options visit: www.hp.com/go/hpqo
Memory FAQs	**What is HP SmartMemory?** HP SmartMemory is unique technology introduced for HP ProLiant Gen8 servers that unlocks certain features available only on HP Qualified Server memory. HP SmartMemory enables HP ProLiant Gen8 systems to reliably identify and verify whether installed memory has passed HP's rigorous qualification and test processes. And because the memory is authenticated, certain extended memory performance features can be enabled through the system ROM. HP SmartMemory will allow future support enhancements through HP Active Health System and other management software. HP SmartMemory is ideal for customers who want assurance of buying genuine HP Qualified memory that is performance tuned for HP ProLiant servers, and capable of future enhanced support through HP Active Health and other management software. **What are the key benefits of HP SmartMemory?** • Increased reliability since the memory undergoes an authentication process that verifies qualification has been performed on HP platforms • Performance tuned and optimized for HP ProLiant servers • Enhanced support through HP Active Health System **Is HP SmartMemory using proprietary memory technology?** HP SmartMemory uses industry standard memory that has been validated on HP systems. Since the memory has completed HP's rigorous test processes on HP platforms, every memory characteristic is known to have met the highest standards. **Will 3rd Party DDR4 memory work in my HP ProLiant server?** Yes. HP supports the Customers' right to choose other memory suppliers but is confident in HP's quality and innovation. Features that are supported today for 3rd Party memory such as pre-failure alerting and error event logging in the IML will remain the same. Enhanced memory performance features that go beyond processor/chipset manufacturer POR specifications for memory speed and power requirements will be unique to HP SmartMemory as they are a benefit of our system-level engineering skills. **What is LRDIMM?** LRDIMM or Load Reduced DIMM is an industry standard memory technology that has been adopted by Intel for their next generation Intel® Xeon® E5-2600 family processor that addresses the need for

greater memory bandwidth and capacity. LRDIMM memory buffer reduces the electrical load to the memory controller and allows higher capacity memory to run at 3 DIMMs per channel. LRDIMM is for customers who require the maximum memory capacity.

Will LRDIMMs work with RDIMMs?

LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a server. The majority of ProLiant Gen9 servers support RDIMM and LRDIMM.

Service and Support

Service and Support

HP Technology Services
HP Technology Services offers you technical consultants and support expertise to solve your most complex infrastructure problems. We help keep your business running, boost availability, and avoid downtime.

Protect your business beyond warranty with HP Care Pack Services
When you buy HP Options, it's also a good time to think about what level of service you may need. HP Care Pack services provide total care and support expertise with committed response choices designed to meet your IT and business need.

HP Foundation Care services deliver scalable support-packages for HP industry-standard servers and software. You can choose the type and level of service that is most suitable for your business needs. New to this portfolio is HP Collaborative Support. If you are running business critical environments, HP offers Proactive Care or Critical Advantage. These services help you deliver high levels of application availability through proactive service management and advanced technical response.

Here is the support service recommendation from the Foundation Care and Proactive Care portfolio. For customized support service solution, HP can work with you to tailor a service solution for your unique support requirements using broader services portfolio of Foundation Care and Proactive Care.

Recommended HP Care Pack Services for optimal satisfaction with your HP product

Recommended Services

3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service
Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

OR

3-Year HP 24x7 4 hour Response, HP Collaborative Support
Offers customers a single point of contact for server problem diagnosis, hardware problem resolution, and basic software problem diagnosis, fault isolation, and resolution if available to HP. If the problem is with HP HW, the representative will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf.

HP ProLiant Server Hardware Installation
Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner

Related HP Care Pack Services to enhance your HP product experience

Related Services

3-Year HP 24x7 4 hour Response, Proactive Care or Critical Advantage
Helps optimize your systems and delivers high levels of application availability through proactive service management and advanced technical response. A skilled Technical Manager will own your query or issue end to end until resolved, delivering a single point of contact for you

OR

3-Year HP 6-hour Onsite Call-to-Repair, HP Collaborative Support
Offers customers a single point of contact for server problem diagnosis, hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request to the HP

Service and Support

	Global Solution Center, and basic software problem diagnosis, fault isolation, and resolution if available to HP. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf. **HP Proactive Select Service** Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.
Insight Remote Support	Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more http://www.hp.com/go/insightremotesupport
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalize IT support anywhere, anytime. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. *HP' Support Center Mobile App is subject to local availability
Parts and materials	HP will provide HP-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements. Supplies and consumable parts will not be provided as part of this service; standard warranty terms and conditions apply. Parts and components that have exceeded their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual or the technical product data sheet will not be provided, repaired or replaced as part of this service.
Warranty / Service Coverage	For ProLiant servers and storage systems, this service covers HP-branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external monitors up to 22" and tower UPS products; these items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been exceeded. Coverage of the UPS battery is not included; standard warranty terms and conditions apply. The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction. It does not apply to any exchange of Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by HP as consumable parts and/or that have exceeded maximum supported lifetime and/or the maximum usage limit as set forth in the manufacturer's operating manual or the technical data sheet are not eligible for the defective media retention service feature option.
For more information	To learn more on services for HP ESSN Options, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant or www.hp.com/services/bladesystem

Technical Specifications

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator

Memory Subsystem Architecture
The memory subsystem architecture is dependent on the ProLiant Gen8 server platform.

For servers using the Intel® Xeon® E5-2600 family processor series:

- 16 DIMM slots: Four memory channels per installed processor with two DIMMs per channel for a total of eight (8) DIMMs or a grand total of sixteen (16) DIMMs for the server.
- 24 DIMM slots: Four memory channels per installed processor with three DIMMs per channel for a total of twelve (12) DIMMs or a grand total of twenty-four (24) DIMMs for the server.

For platform specific memory details please refer to the HP ProLiant user guide at: http://www.hp.com/support.

General Memory Population Rules and Guidelines:

- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- To maximize performance, it is recommended to balance the total memory capacity between all installed processors and load the channels similarly whenever possible.
- When two processors are installed, balance the DIMMs across the two processors.
- White DIMM slots denote the first slot to be populated in a channel.
- Place the DIMMs with the highest number of ranks in the white slot when mixing DIMMs of different ranks on the same channel.
- Do not mix UDIMMs, RDIMMs or LRDIMMs.
- Quad rank RDIMMs are not supported in HP ProLiant Gen8 servers.
- Quad rank LRDIMMs are capable of up to three DIMMs per channel.
- RDIMMs operating at either 1.35V or 1.5V may be mixed in any order, but the system will power them at the higher voltage.
- DIMMs of different speeds may be mixed in any order; the server will select a common optimal speed.
- The maximum memory speed is a function of the memory type, memory configuration, and processor model.
- The maximum memory capacity is a function of the memory type and number of installed processors.
- To realize the performance memory capabilities listed in this document, HP SmartMemory is required.

ProLiant Gen9 Supported Memory Bandwidth for HP ProLiant Gen9 Intel® Xeon® E5-2XXX Processor Family

	Register DIMM (RDIMM)		Load Reduced (LRDIMM)
DIMM Rank ->	Single Rank (1R)	Dual Rank (2R)	Quad Rank (4R)
DIMM Capacity ->	8GB	16GB	32GB
Voltage	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V
SLOTS THAT CAN BE POPULATED			
4 slot servers	4	4	NA
8 slot servers	8	8	NA
12 slot servers	12	12	12

Technical Specifications

16 slot servers	16	16	16
24 slot servers	24	24	24
32 slot server	32	32	32
MAXIMUM CAPACITY (GB)*			
4 slot servers	32	64	NA
8 slot servers	64	128	NA
12 slot servers	96	192	384
16 slot servers	128	256	512
24 slot servers	192	384	768
32 slot servers	256	512	1024
POPULATED DIMM SPEED (MT/s)			
1 DIMM Per Channel	2133	2133	2133
2 DIMM Per Channel	2133	2133	2133
3 DIMM Per Channel	1600	1600	1600

Memory Speed by Processor Model

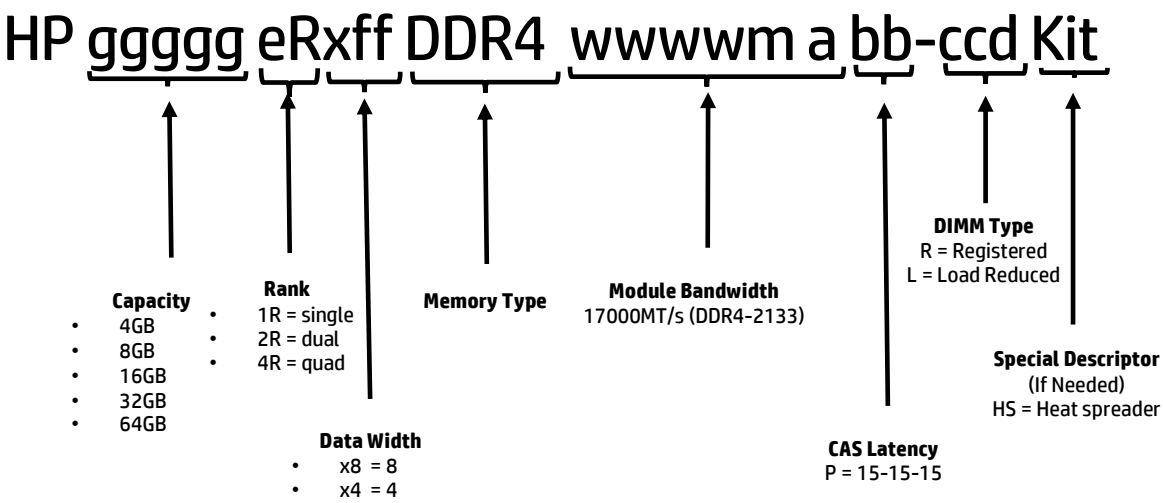
HP ProLiant Gen8 Intel® Xeon® E5-2600 v3 Series Processor Family:

Processor Models	**Supported Memory Speeds**
E5-2690 v3, E5-2680 v3, E5-2670 v3, E5-2667 v3, E5-2660 v3, E5-2650 v3, E5-2650L v3, E5-2643 v3, E5-2637 v3, E5-2683 v3, E5-2695 v3, E5-2697 v3, E5-2698 v3, E5-2699 v3, E5-2687W v3	DDR4 2133 MHz
E5-2623 v3, E5-2640 v3, E5-2630 v3, E5-2620 v3, E5-2630L v3	DDR4 1866MHz
E5-2609 v3, E5-2603 v3	DDR4 1600MHz

NOTE: Capacity references are rounded to the common gigabyte (GB) values.

- 2GB = 2,048MB
- 4GB = 4,096MB
- 8GB = 8,192MB
- 16GB = 16,384MB
- 32GB = 32,768MB

Memory options part number decoder



Above format becomes; HP 8GB 1Rx4 DDR4-2133P-R Kit

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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